REMARKS

In the non-final 18 November 2005 *Office Action*, the Examiner rejects Claims 1-5 and 7-50. Applicants thank the Examiner with appreciation for the careful consideration and examination given to the Application. By this Response, Applicants amend Claims 5, 10, 13, 20, 25, 27, 32-35, 39-41, and 46 to clarify Applicant's currently claimed invention.

Applicants reserve the right to present new or additional claims in this Application that have similar or broader scope as originally filed. Applicants also reserve the right to present additional claims in a later-filed continuation application that have similar or broader scope as originally filed.

After entry of this Response, Claims 1-5 and 7-50 are pending in the Application. Applicants respectfully assert that Claims 1-5 and 7-50 are in condition for allowance and respectfully requests reconsideration of the claims in light of the following remarks. Applicants believe that Claims 1-5 and 7-50 are allowable for the following reasons.

I. Claim Objections

The Examiner objected to Claim 10 because of certain informalities, and stated that it should depend on Claim 1. Claim 10, as amended, depends on Claim 1. Applicant respectfully requests reconsideration and withdrawal of the objection.

II. 35 U.S.C. § 112 Claim Rejections

The Examiner rejects Claims 33-35 and 39-41 under 35 U.S.C. § 112, second paragraph. Claim 33 has been amended to be directed to a method for a listening device. According to claim 33, outputs from the signal paths in the listening device are equalized by method claim 1. Claim 34 has been amended to be directed to a method for a hearing aid. According to claim 34, outputs from the signal paths in the hearing aid are equalized by method claim 1. Claim 35 has been amended to be directed to a method for a headset. According to claim 35, outputs from the signal paths in the headset are equalized by method claim 1. Claim 39 has been amended to depend on claim 36. Claim 40 has been amended to depend on claim 37. Claim 41 has been amended to depend on claim 38.

It is respectfully submitted that claims 33-35 and 39-41 are definite and comply with 35 U.S.C. § 112. Thus, Applicant respectfully requests withdrawal of the § 112 rejections.

III. 35 U.S.C. § 103 Rejections To Claims 1-5, 7-11, 14-24, 26, & 28-46

Under Paragraph 7 of the Office Action, the Examiner rejected claims 1-5, 7-11, 14-24, 26, and 28-46 under 35 U.S.C. 103(a) as being unpatentable in view of Gardner (US Patent No. 5,737,433) in view of Hamabe (US Patent No. 5,426,703). Applicant respectfully requests reconsideration and withdrawal of the rejections for reasons as set out below.

Gardner discloses a sound environment control system. The system of Gardner includes a signal path having a filter 42 and an adaptor 44 for adapting the filter based on processed environmental sound e(n) (Figs. 2-3 of Gardner). Gardner determines a filter function of the filter 42 based on time-varying noise source e(n).

By contrast, according to Applicants' claimed invention, a predictable noise signal is provided to each signal path having a microphone (Claims 1, 16, 42, and 43), which allows for accurate computation of the transfer function of the signal path.

The Examiner acknowledged that Gardner does not clearly teach that each signal path has a microphone, and a module for applying a predictable noise to each path to generate an output noise. However, the Examiner stated that Hamabe teaches each signal path having a microphone (Fig. 1B, "mike" 8a-8b) and a module for applying a predictable noise (such as, white noise) to each signal path to generate an output noise (col. 5, line 31-col. 6, line 67 of Hamabe).

Applicant respectfully disagrees with the Examiner. In Hamabe, the microphones are used to capture a combination of environmental noise sources and noise generated by speakers (col. 1, line 15-25 of Hamabe). By having knowledge about this generated noise combined with the captured noise, it is possible to design a system that adaptively modifies the generated noise presented at the loud speaker to out-phase the environmental noise. Thus, in Hamabe, an algorithm is running so as to continuously ensure that the phase difference between the environmental noise and the generated loud speaker noise is 180 degrees (col. 1, line 1-5 of Hamabe), whereby the environmental noise becomes inaudible.

Hamabe generates noise to cancel environmental noise so that the generated noise is targeted towards out phasing environmental noise. More specifically, Hamabe generates an adaptively modified noise created from white noise to minimize phase difference between said white noise and environmental noise. The use of adaptively, modified white noise to minimize the phase difference between said white noise and environmental noise (i.e. unknown noise) is quite different from the use of a ***predictable noise*** to identify the transfer function of a signal

path having a microphone as Applicants currently claim.

Hamabe uses a signal path consisting of a microphone, a path, and a loud speaker (also known as "a signal path"). In Hamabe, the signal path will be a combination of the generated noise coming from the loud speaker and noise coming from the environment noise. The generated noise is "adapted" on a continuous basis such that the generated noise cancels the environmental noise. This is an ideal situation, and it may not work well in practice. Because Hamabe's signal path is composed by both generated noise and unknown, environmental noise, the signal path of Hamabe cannot be explicitly determined. Indeed, there is no way of explicitly identifying the signal path in Hamabe. It varies the time due to the properties of the environmental noise.

Hamabe requires environmental noise (unknown noise) to implement adaptively canceling the environmental noise. If the unknown, environment noise component is removed from Hamabe, the purpose of the entire system and method of Hamabe falls apart.

As discussed above, according to the present invention, a predictable noise signal is applied to each signal path having a microphone, which allows for accurate computation of the transfer function of the signal path. According to the present application, a predictable noise is provided from, for example, a loud speaker, to a signal path having a microphone to isolate the transfer function of the signal path and thus identify the transfer function of the signal path. The white noise produced by the loud speaker is not adaptively modified. If this had been the case the transfer function of the signal path could not be identified.

The Examiner stated that it would have been obvious to one of ordinary skill to combine Hamabe into Gardner to provide an active noise eliminating system which can correct and update the noise elimination transfer function. Applicant respectfully disagrees with the Examiner, and respectfully submits that the Examiner has not set forth a *prima facie* case of obviousness as required by MPEP § 2143.

Hamabe's invention has the purpose of reducing environmental noise in a closed space, for example, a car (col. 1, lines 6-10 of Hamabe). Thus, the background and motivations for Gardner and Hamabe are completely different. Accordingly, there is no motivation to combine Gardner with Hamabe.

Further, none of the cited references recognize the advantages of Applicants' claimed invention, e.g., accurate identification of the transfer function by using a predictable noise. Thus,

it would not have obvious to combine the references in the manner proposed by the Examiner to produce Applicants' currently claimed invention.

The dependent claims further include features not suggested or taught by Gardner and Hamabe. For example, Claims 5, 20, and 46 recite that for each path, a second predictable noise signal has a property substantially identical to a first predictable noise signal, and is substantially identical to the first predictable noise signal on a sample-by-sample basis. Claims 13, 25 and 27 recite that for each path, the second predictable noise signal is substantially identical to the first predictable noise signal on a sample-by-sample basis. Thus, according to claims 5, 13, 20, 25, 27, and 46, a first predictable noise signal and a second predictable noise signal substantially identical to the first predictable noise signal on a sample-by-sample basis are used for each signal path. Indeed, Applicants respectfully assert that Gardner and Hamabe, taken alone or in combination, teach or fairly suggest the subject matter of Claims 5, 13, 20, 25, 27, and 46.

With respect to the rejections of claims 5, 20, and 46 (page 7 of the Office Action), the Examiner considered that the "white noise" of Hamabe (26 of Fig. 1B) corresponds to a first predictable noise sample signal of these claims, and "engine noise" of Hamabe (4 of Fig. 1A) corresponds to a second predictable noise sample signal of these claims. Applicant respectfully disagrees with the Examiner. The two noise sources of Hamabe will never be the same on a sample-per-sample basis as claimed by Applicants.

Claim 13 (claim 25) recites for each signal path, utilizing a maximum length sequence generator to generate the second (first) predictable digital noise that is substantially identical to the first (second) predictable digital noise signal on a sample-by-sample basis. Claim 27 recites a second maximum length sequence noise that is substantially identical to the first maximum length sequence noise on a sample-by-sample basis, for each path. Claim 32 recites that for each path, the first predictable digital noise signal and the second predictable noise signal are generated by the maximum length sequence generator. By using the knowledge of the maximum length sequence noise, the signal path can be explicitly identified for each signal path, as described in the patent application. None of Gardner and Hamabe taken alone or in combination thereof suggests or teaches the subject matter defined by claims 13, 25, 27, and 32.

Further, according to claims 39-41, a filtering function for each signal path is determined by using a predictable noise, and then is loaded to each signal equalization filter. None of Gardner and Hamabe taken alone or in combination thereof suggests or teaches the subject

matter defined by claims 39-41.

Further, according to claims 42 and 43, a filtering function for each signal path is determined by using a predictable noise, and is applied for each signal path. After the equalization process is completed, the sounds signals are provided to the signal path. None of Gardner and Hamabe taken alone or in combination thereof suggests or teaches the subject matter defined by claims 42 and 43.

Hence it is respectfully submitted that Claims 1-5, 7-11, 14-24, 26, and 28-46 are patentable in view of the cited references. Applicants respectfully request withdrawal of the § 103 rejections to Claims 1-5, 7-11, 14-24, 26, and 28-46.

IV. 35 U.S.C. § 103 Rejections To Claims 12-13, 25, 27, & 47-48

Under Paragraph 8 of the Office Action, the Examiner rejected claims 12-13, 25, 27 and 47-48 under 35 U.S.C. § 103(a) as being unpatentable in view of Gardner as modified by Hamabe, and further in view of Puckette (US Patent No. 3,654,390).

Claims 12-13 depend on claim 1. Claims 25 and 27 depend on claim 16. Claims 47-48 depend on claim 43. As described above, Gardner and Hamabe fail to suggest or teach the subject matter defined by claims 1, 16, and 43. Accordingly, because Puckette fails to overcome the deficiencies of Gardner and Hamabe, Applicants' Claims 12-13, 25, 27, and 47-48 are also patentable over the Gardner-Hamabe-Puckette combination.

Puckette discloses a system for synchronizing a pulse sequence with another pulse sequence, and merely states a synchronizer for two maximum length sequence generators (Abstract). As described above, Gardner requires time-varying noise sources to determine a filter function, and Hamabe requires environmental noise (unknown noise) to implement adaptively canceling the environmental noise.

There is no motivation in the cited references to combine Gardner and Hamabe with Puckette to produce the present invention. Puckette does not add any teaching to Gardner and Hamabe to render claims 1, 16 and 43 unpatentable. Hence it is respectfully submitted that claims 12-13, 25, 27 and 47-48 are patentable in view of the cited references. Withdrawal of the § 103 rejections to Claims 12-13, 25, 27 and 47-48 is respectfully requested.

V. 35 U.S.C. § 103 Rejections To Claims 49-50

Under Paragraph 9 of the Office Action, the Examiner rejected claims 49-50 under 35 USC § 103(a) as being unpatentable in view of Gardner as modified by Hamabe, and further in view of Roberts ("Digital Signal Processing", ISBN 0-2-1-16350-0, pp. 486-487.). Applicants respectfully traverse the § 103 rejection.

Claims 49-50 depend on claim 43. As described above, Gardner and Hamabe fail to suggest and teach the subject matter defined by claim 43. Roberts merely discloses an Auto Regressive Moving Average (ARMA). Roberts does not add any teaching to Gardner and Hamabe to render claim 43 unpatentable, and thus fail to overcome the deficiencies of Gardner and Hamabe.

Hence it is respectfully submitted that claim 43 is patentable in view of the cited references. Withdrawal of the § 103 rejection to Claims 49-50 is respectfully requested.

VI. Fees

This *Response and Amendment* is being filed within six months of the *Office Action*, thus Applicant submits herewith a petition for a three-month extension and the applicable non-small entity fee ($1,020.00). No claims fees are believed due because no new claims are presented. Applicants believe that no additional fees are due, however, the Commissioner is authorized to charge any other fees or credit any overpayments to Deposit Account No. 20-1507.

VII. Conclusion

By the present *Response and Amendment*, the Application is believed to be in form for allowance. If the Examiner has any further questions or reservations, or believes that an Examiner's amendment will place the Application into condition for allowance, the Examiner is invited to telephone Hunter Yancey at 404.885.3696.

Respectfully submitted,

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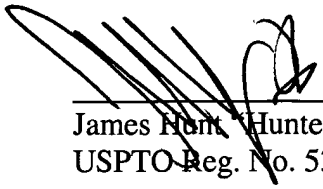

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